Colorado Water Quality Control Division

RECLAIMED WATER PROGRAM

Policies & Procedures

Policy No:	WQP-25
Initiated By:	Andrew Ross
Approved By:	
Effective Date:	12-05-2007
Revision No.:	
Revision Date:	

Monitoring and Reporting Requirements for Reclaimed Water Treatment Facilities

Purpose: To provide guidance to Division personnel and treaters on the implementation of the "Monitoring, Recording and Reporting" section of the Colorado Water Quality Control Commission *Reclaimed Water Control Regulation* (Regulation No. 84), which states in part:

> "Treaters and users operating pursuant to a Notice of Authorization shall be subject to such monitoring, record keeping, and reporting requirements as may be reasonably required by the Division…"

Background/ Rationale: The intent of this policy is to establish a procedure to ensure representative and consistent monitoring of reclaimed water delivered to users.

It is appropriate to determine the frequency of monitoring based on perceived risk to public health. The risk to the public is directly related to the potential of exposure to the reclaimed water and the reclaimed water quality. The classification of reclaimed water into categories was done to characterize the level of potential public exposure. Category 1 reclaimed water allows virtually no possibility of public exposure and Category 3 reclaimed water offers the greatest chance of public exposure. Rationales on the individual parameters in this policy are as follows:

Finished Water Parameters:

E. coli

E.coli is an organism that is commonly used as a surrogate for microbial pathogens. The turnaround time for an *E.coli* analysis is 24 hours. *E. coli* is not used as an operating parameter (i.e., turbidity or disinfection residual). However, it is used to confirm that a reclaimed water facility is performing as designed and therefore the public health is being protected.

Turbidity

Turbidity is a measure of the "clarity" of water and provides an indication of particulate content which can affect the disinfection of the water and inactivation of pathogenic organisms.

Total Suspended Solids (TSS)

TSS is also a measure of particulate matter in water and is important because disinfection of pathogenic organisms is most effective in low-particulate waters. Continuous monitors for

TSS are not available so discrete sampling is required. Analysis frequencies are set consistent with those for E. coli. Approved sample types include grab or composite samples.

Disinfection

There is no specific requirement for either the type of disinfection applied at a reclaimed water facility or the frequency of disinfection monitoring. However, "the requirements for monitoring to determine the quality of all categories of reclaimed water should include frequent determinations and record-keeping to assure that disinfection is being provided prior to use."

Secondary Treatment Parameters:

Secondary treatment is required under Regulation 84 for all categories of reclaimed water and is a necessary prerequisite for subsequent treatment and disinfection to be effective in producing a safe product for use in areas where human contact is expected. Monitoring of the below-identified parameters is appropriate to demonstrate that secondary treatment has been attained.

BOD_5, TSS and BOD_5 and TSS Percent Removal Efficiency

Biochemical oxygen demand (BOD) is a measure of how much oxygen is required to biologically decompose organic matter in the water. Percent removal monitoring is a measure of the degree of treatment that has been attained.

Policy/ Procedures:

This policy defines monitoring and reporting requirements for reclaimed water facilities. Sampling for all required parameters shall be representative of the reclaimed water delivered to users. EPA or Division approved methods of analysis must be used for all parameters analyzed. Sampling will only be required during periods when reclaimed water is being delivered to users.

Exceptions to the policy will generally not be made. Where an entity is unable to obtain results at the required frequency due to physical constraints or, where the entity can show that extreme economic hardship would result from compliance with this policy, the Division may substitute an alternate requirement. If required sampling and analysis is not performed due to extenuating circumstances (such as monitoring equipment failure or inclement weather), then that shall be noted in the annual report and sampling shall be performed as soon as possible thereafter. . If reclaimed water facilities experience exceedances of any numeric criteria, the Division reserves the right to require more frequent sampling until consistent compliance is achieved.

Monitoring Requirements

Sampling and analytical requirements are established for each category of reclaimed water delivered. Table 1, below, summarizes monitoring requirements for *reclaimed water parameters* applicable to all reclaimed water treatment facilities. Table 2 summarizes monitoring requirements for *secondary treatment parameters* applicable to treaters that do not have a CDPS discharge permit or that receive reclaimed wastewater from a facility that does not have a CDPS discharge permit. The point of compliance for demonstrating that secondary treatment has been attained may be the same or different than the point of compliance for demonstrating that finished water standards are attained.

TABLE 1
FREQUENCY OF MONITORING FOR RECLAIMED WATER PARAMETERS

Reclaimed Water Type	E. coli and TSS Sampling and Analysis Frequency	Sample Type
Category 1	1 sample per 7 days	Grab[1]
Category 2	2 samples per 7 days[2]	Grab
Category 3	4 samples per 7 days[2]	Grab

1 Grab or composite samples may be used for total suspended solids analysis.
2 No TSS monitoring is required for these Categories of reclaimed water

Sampling and analyses for (1) E. coli and (2) either total suspended solids (TSS) (Category 1) or turbidity (Categories 2 and 3) are required for all categories of reclaimed water. Table 1 sets forth the sampling type, frequency and analysis for E. coli and TSS. *E. coli* samples should be representative of the reclaimed water delivered to users. Compliance is based on a single sample maximum and a monthly geometric mean. Sample type, frequency, and analysis for turbidity is described in the following paragraph.

All samples shall be obtained at the approved point of compliance listed in the Treater's Notice of Authorization. Where Category 2 or Category 3 reclaimed water is delivered for less than 12 hours, a turbidity reading shall be taken at the point of compliance during the period of delivery. When reclaimed water is delivered for longer than a 12-hour period, a turbidity reading must be taken in the first 12 hours and every subsequent 12 hour time frame until the plant is out of service. The sampling frequency for turbidity was developed to ensure regulatory compliance could be met without placing a hardship on small facilities. The frequency of one (1) reading per twelve (12) hours of operation allows personnel to take the required readings during normal business hours. For those months in which a constant supply of reclaimed water is provided to users, approximately sixty (60) turbidity readings would be made; this is an adequate statistical data set to accurately represent the quality of reclaimed water being delivered.

The current regulatory limit for turbidity is based upon a monthly average of all readings with no exceedance in 95% of all readings during a calendar month. Samples should be taken at random times during the filter operating cycle to provide unbiased data on filter performance.

Approved sampling methods include taking periodic grab samples and analyzing on a bench top turbidimeter or utilizing an in-line turbidity meter. There are drawbacks to both methods; the sampling method chosen should balance operational constraints, equipment reliability, and financial considerations. A turbidity reading may be obtained from a continuous reading online turbidimeter or a bench top turbidimeter for which the reading was obtained from a grab sample for turbidity, taken at the point of compliance.

The manufacturer's recommendations concerning calibration of the turbidimeter using primary standards, calibration confirmation using secondary standards and maintenance shall be followed and documented.

Where a reclaimed water treatment facility ("treater") does not have a CDPS discharge permit or receives reclaimed wastewater from a facility that does not have a CDPS discharge permit, the treater will be required to monitor secondary treatment parameters as shown in Table 2, below.

TABLE 2
FREQUENCY OF MONITORING FOR SECONDARY TREATMENT PARAMETERS

Parameter	Monitoring Frequency	Sample Type
Flow, GPD	Continuous	Recorder
BOD_5, mg/l	Monthly	Composite[3]
BOD_5, Percent Removal, %	Monthly	Calculated
TSS, mg/l	Monthly[4]	Composite
TSS, Percent Removal, %	Monthly	Calculated
pH, s.u.	Monthly	Grab
Oil and Grease, mg/l	Monthly	Visual and Grab

[3] A "composite" sample, for monitoring requirements, is defined as a minimum of four (4) grab samples collected at equally spaced two (2) hour intervals and proportioned according to flow.

[4] Where category 1 water is being provided, and additional treatment beyond that to achieve secondary treatment is being provided, monitoring for TSS at the finished water point of compliance may be done.

Confirmation of Disinfection

When operators or other appropriate personnel are present during any day that finished reclaimed water is being produced, they should verify that the disinfection system is functioning. This can be accomplished by analyzing the water to verify the presence of an appropriate concentration of disinfectant or by verifying that the disinfection system is functioning properly by confirming that disinfectant is being fed at the necessary rate or that the necessary number of banks of UV light are in service. Records confirming the status of the disinfection system shall be kept on site.

Other Monitoring

Treaters of reclaimed water are required to install flow measuring devices to support the Division's assessment of reuse fees and to ensure that the treatment system operates within its rated hydraulic capacity. At the request of the Division, the treater must be able to show technical documentation of the accuracy of any flow measuring device used in obtaining data that is submitted in the monitoring report. At a minimum, the flow measuring devices must be accurate to within ± ten percent (10%) of the actual flows undergoing measurement. Accuracy of the flow meter is to be determined annually.

Where the land application of reclaimed water is subject to limitations on concentration and/or loading of nitrogen or phosphorus pursuant to a control regulation adopted by the Water Quality Control Commission and the treater intends to have such limitations included in the Notice of Authorization issued under Regulation No 84, the Division will include appropriate monitoring and reporting requirements consistent with the applicable control regulation and its practice for monitoring under such regulation.

Violations: Each facility should document in its Reuse System Management Plan the steps to follow during a violation of the regulatory standards. At a minimum, if a violation occurs for Categories 1 or 2 water, the Treater should confirm the accuracy of the sample that indicated

a violation, and additional samples will need to be taken to ensure that the treatment plant is running properly. The Treater should also notify the Division of what occurred and the remediation steps taken as required in the Treaters' Notice of Authorization. It is the Treater's responsibility to demonstrate that the plant is back in compliance.

At a minimum, for Category 3 water, if a violation occurs, discontinue use of the water until the plant is back in compliance. Use of the water is prohibited without explicit authorization from the Division.

Reporting: Monitoring results and a summary of the operation of the disinfection process will be included in the Treater's annual report pursuant to the treater's NOA issued pursuant to Regulation No. 84.